

1/PRTS

**MOTOR VEHICLE WITH A FRONT-MOUNTED ENGINE***50027*  
**Technical field**

The invention relates to a motor vehicle with a forward-mounted engine, in  
5 accordance with the preamble to patent claim 1.

**State of the art**

In trucks it is usual for the engine, clutch, gearbox and other components to be  
situated far forward, under a driver's cab, which is often tiltable forwards to provide  
10 access. These components and the driver's cab usually have extending to the rear of  
them an open vehicle frame which consists of C-beams, supports rear axles and has on  
top of it some form of load carrier which extends sideways beyond the vehicle frame.

Such a type of vehicle frame is relatively weak flexurally and torsionally and causes  
15 limitations with regard to good running characteristics in cases where a rigid vehicle  
frame is desired. This type of vehicle superstructure, with an engine space which is  
usually open downwards, and with components situated at various points forward on  
the vehicle, entails relatively large flow resistance which has unfavourable effects on  
operational economics.

20 In the light of endeavours to improve the running characteristics and operational  
economics of vehicles, arrangements of these known kinds therefore seem less  
advantageous.

**Object of the invention**

25 The invention aims to provide an improved vehicle design which does not have the  
aforesaid disadvantages.

*50027*  
**Description of the invention**

30 This object is achieved according to the invention by designing a motor vehicle  
according to the definition in patent claim 1.

Providing motor vehicles with a tubular chassis element which can easily be made resistant to torsion and bending makes it possible for components forming part of the vehicle's driveline to be provided with good protection by being situated inside this chassis element. Further designing the vehicle so that air is led through this chassis element by means of a guide arrangement provides components within the chassis element with necessary cooling and makes it possible for the vehicle to be provided, by means of the guide arrangement and the chassis element, with a smoother underside and hence reduced flow resistance while in motion.

- 10 Further advantages and features of the invention are indicated in the ensuing description and patent claims.

#### Description of drawing

- 15 The invention is explained in more detail below on the basis of an embodiment depicted in the attached drawing, in which:

Fig. 1 is a perspective view, partly in section, of a motor vehicle according to the invention,

Fig. 2 is a schematic horizontal section through the vehicle in Fig. 1,

- 20 Fig. 3 is a section III-III in Fig. 2, and

Fig. 4 is a section IV-IV in Fig. 2.

#### Description of a preferred embodiment

- A motor vehicle 1 of the truck type depicted in Fig. 1 has, running in its longitudinal direction, a tubular chassis element 2 which is provided on each side with a number of support devices 3 which are distributed along the chassis element 2 and protrude sideways. The chassis element 2 and the support devices 3 have resting on them a load platform 4 which may possibly be provided with some form of superstructure. In front of the load platform 4 there is a driver's cab 5 which has at its front an air intake 6 which may possibly have a number of apertures in the vehicle's front.
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As indicated in more detail in Fig. 2, there is behind the air intake 6 a fan 7, advantageously of radial type, which propels air radially towards a radiator 9 which

belongs to the vehicle's engine 8, is arranged round the fan 7 and may advantageously be divided into a number of individual radiator elements. The fan 7 and the radiator 9 are dimensioned to provide good cooling of the engine 8 in a variety of operating situations. Part of the air drawn in is discharged, after passing the radiator 9, via air vents 10, e.g. one on each side of the vehicle. The remainder of the air drawn in is led partly as combustion air to the engine 8 and partly via a guide arrangement 11 past the engine 8 into the inside of the tubular chassis element 2 before finally leaving the chassis element 2 via an air outlet 12 at the latter's rear end. The air flow is represented by arrows 13.

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The guide arrangement 11 round the motor 8 includes (see Fig. 3) a lower portion 14 in the driver's cab 5, a bottom plate 15 arranged under the engine and a section 16 of the front wheel housing. These various parts are jointly designed so that air is led round the engine and rearwards to the chassis element 2. The bottom plate 15 is also intended to reduce air resistance by providing the front portion of the vehicle with a smooth underside. The engine 8 rests on beams 17 which are fastened in the forward end of the chassis element 2.

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Fig. 2 also shows that from the engine 8 a forward driveshaft 18 runs inside the chassis element 2 to a gearbox 19 which is accommodated likewise inside the chassis element 2 and is situated immediately forward of, and is connected to, a first rear axle 20. A second rear axle 21 is driven from the gearbox 19 via a rear driveshaft 22. The air which flows through the chassis element 2 cools the gearbox 19 and also other components situated in the chassis element 2, e.g. a compressor 23 for the vehicle's brake system and components for the vehicle's air conditioning system. The two rear axles 20 and 21 are supported movably in the chassis element 2 via suspension parts not further detailed here.

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The construction of the chassis element 2 executed in the form of a shell structure is indicated in more detail in Fig. 4. At mutual spacings along the chassis element 2 there are a number of rectangular ribs 25 which have panels 26 fastened round their sides so as to form a tubular space 27. At at least some of the ribs 25, support devices 3 are fastened on both sides and have side panels 28 and bottom panels 29 fastened to

them. The underside panels 26 and 29 provide the vehicle with a smooth underside, and the side panels 28 and bottom panels 29 create enclosed spaces for various components on both sides of the chassis element 2. Advantageously, at least some of the panels, or parts of them, are detachable to provide access to components in or  
5 alongside the chassis element 2.

The air outlet 12 at the rear of the chassis element 2 may take the form of apertures in an endplate on the chassis element 2. It is possible for the chassis element 2 to contain a fan 30 to influence the air flow. One possibility is for this fan to be situated  
10 at the air outlet 12. The ribs 25 forming part of the chassis element 2, and the panels 26, are dimensioned so as to create a structure resistant to bending and torsion. This combined with advantageously designed wheel suspensions makes improved vehicle running characteristics possible. The protected space within the rigid chassis element 2 makes it possible for the gearbox to be situated close to the vehicle's powered  
15 wheels, resulting in good weight distribution, while at the same time the transmission path for large torques from the gearbox will be short and the gearbox will be in a well-protected location.

The air which flows through the chassis element 2 is normally intended for cooling  
20 various components inside the chassis element, but it is of course possible, e.g. for operation in severe cold, to lead warmer air rearwards and thereby reduce the cooling. This may be achieved, for example, by using advantageously designed air flow switching devices to cause a greater proportion of the air passing the radiator 9 to pass through the chassis element 2.

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The design of the guide arrangement 11 for the air flow rearwards round the engine 8 depends on the design of the forward portion of the vehicle and may therefore be designed otherwise than as described here.